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ABSTRACT

This guide focuses on the use of computers and cooperative learning techniques in classrooms that include students with disabilities. The guide outlines the characteristics of cooperative learning such as goal interdependence, individual accountability, and heterogeneous groups, emphasizing the value of each group member. Several cooperative learning models are also described, ranging from simple structures such as "think, pair, share" to more complex structures called "learning together," "jigsaw," or "student team learning." The benefits of incorporating computer usage into cooperative learning activities are explored, and four classroom scenarios that illustrate these benefits are described. A list of 6 references, 3 readings, 4 organizations, and 16 software programs concludes the guide. (JDD)

Center for Special Education Technology

Tech Use Guide

Using Computer Technology

Computers and Cooperative Learning

Cooperative learning is a teaching method that promotes high student achievement, encourages students' understanding of material, and increases students' enjoyment of school and their classmates. The benefits from lessons where students work in cooperative groups have been documented by research (Johnson & Johnson, 1989). Teachers are echoing this message as they are experiencing success when their students work in cooperative groups. And as the message spreads, more teachers are becoming interested in cooperative learning.

Characteristics

Cooperative learning is more than just putting students together in groups. It is a teaching strategy characterized by:

- **Positive goal interdependence of group members.** This may consist of having a common goal, sharing materials, or assigning members different parts of the task.
- **Individual accountability.** Each group member is asked to be responsible for his or her own learning, as well as responsible for helping others learn.
- **Heterogeneous groups.** The composition of the class should be reflected in each of the groups. The teacher assigns students who differ in ability, culture, gender, and race to work together. These differences enable students to make unique contributions toward the group goal.
- **Teacher observation and intervention when appropriate.** While students are working, the role of the teacher ideally should be to monitor the groups. When problems in understanding the content or in interactions occur, the teacher may help focus the group on the problem. Rather than solving the problem, the teacher should try to help the group discuss possible solutions.
- **Instruction in collaborative skills.** Emphasis is on building skills which help students to work together. Role playing and examples of the skill are used to depict the expected behavior. "How to actively listen," or "how to disagree in an agreeable way" are two skills that may be modeled.
- **Group processing/debriefing at the conclusion of the lesson.** There needs to be discussion of the content, as well as how the group functioned while working together. The observations of the teacher, as well as student input, should be used to create a plan for the next time the group meets.

These features distinguish the cooperative group from the traditional student groups. Cooperative groups foster positive interactions that result in student academic achievement and in development of collaborative skills.

Mainstreamed students should be welcome in these cooperative groups because they provide additional group heterogeneity. Each member should be valued, as his or her diversity of skills and background are useful for some aspect of the work. Thus a member with disabilities as well as a nondisabled member ought to be viewed as an asset to the group. Working together can provide an opportunity for stereotypes to fall away and for students with disabilities to become friends with classmates. These relationships might not develop if the class works competitively or individually.

Models

A number of different cooperative learning models have been developed. Some of these models are simple cooperative structures, and some are more complex structures called *learning together*, *jigsaw*, or *student team learning*. The lesson's goal determines which model will be most effective.

One example of a *simple cooperative structure* developed by Frank Lyman is called "Think, Pair, Share" (Kagen, 1985). The teacher presents a question to the class. Students think about the question, turn to a partner, and explain their written or verbal answers. Following this, the student and partner join another dyad to discuss their answers. By pre-assigning partners, students know who to talk to when the time comes to discuss answers. This structure is easy to use and effective with students of many ages.

Learning together is described by Roger and David Johnson (1986). Students work in a heterogeneous team where each member is expected to contribute to the group's task. In the process of completing the task, each

member has the responsibility to master the material as well as to help others to master it. All share in the group's reward. A part of the lesson is to practice one or two social skills identified and modeled by the teacher. Data from observation of the group's work are collected, and this is discussed at the end of the lesson.

Elliot Aronson (1978) describes his approach as *jigsaw*. It consists of each student mastering part, or a piece of, the assigned material. Just as all the pieces fit together to complete a jigsaw puzzle, here all the pieces of information fit together to complete the task. Each student is accountable for becoming an expert on some of the material and then teaching it to the rest of the group. Thus every group member teaches and is taught by other group members. The information, when combined, includes everything required for the group assignment.

Robert Slavin (1986) has several highly structured models known as *student team learning*. Students work together in groups that often consist of one high-achieving, one low-achieving, and two average students. Material is presented to students following the method of presentation preferred by the teacher. Then students discuss and practice in their groups. Later they take a test or play a game using the material, and student achievement is rewarded. The test or game format may be continued each week, with rewards given for improvement of work over the previous week's work.

These models can be used in computer lessons. Illustrations of what the lesson might be like and software that would be conducive to the cooperative format follow in the section on classroom scenarios. For more detailed explanations of the models, consult the references at the end of this guide.

The Computer and Cooperative Learning

When the computer enters the classroom, it can be a tool that presents information, calls for student response, monitors the lesson, or records success. It gives immediate positive reinforcement. With its interactive nature, the computer helps give more structure to lessons and thus assists students with completing tasks. The teacher can concentrate on giving help where needed, as well as reminding students to remain on task. Using the computer for learning is a method that many students prefer.

Very often each student is assigned to one computer. Cooperative learning naturally requires that several students be assigned to a computer and thus allows scarce computer resources to be used by more than one student. While not replacing the one-on-one instruction, cooperative computer use does offer an alternative. It allows the computer to come into the classroom, rather than be in a lab. When this happens, the computer can become an integral part of the classroom. With the computer, cooperative learning can be used several times a day, not as a novel approach, but actually shared throughout the day.

Research has shown that the good results from cooperative learning transfer to computer-based instruction (Johnson, Johnson, & Stanne, 1986). Achievement is increased, especially for low-achieving students. As the computer presents information, there is an opportunity for students to discuss and analyze what appears on the computer screen. Students who understand the information can explain and elaborate to group members who don't understand. Those who receive help profit from the explanations and often put forth greater effort in this caring atmosphere. A concern for one another and an increase in self-esteem can develop.

A teacher makes decisions about what to teach and plans the lesson to accomplish the goals. At this stage, using the computer and/or cooperative learning for all or part of the lesson may be considered. Effective teaching strategies that are part of regular teaching can be used along with computers and cooperative learning.

Classroom Scenarios

What does a lesson look like when computers and cooperative learning are used? The following are just a few of the classroom scenarios possible with computers and cooperative learning.

Scenario 1

Students are clustered around a computer using word processing. They are in the prewriting stage and are making a vocabulary list about a topic. Each student gives an idea which is added to the list on the screen. If someone doesn't know what to say, others give suggestions. When the list is complete, it may be printed out and students can go to their desks to write their story, or the group may continue working together to create a group story.

Any word processing program, such as *Bank Street Writer*, can be used for listing vocabulary or ideas. Software programs, such as *Story Tailor*, or *Decisions, Decisions*, which present material and invite student response can be used for simple cooperative structures.

Scenario 2

A group around the computer is using problem-solving software. Each group member is performing a different role. One member is designated as the keyboarder, one as the manager to identify group consensus, one as the reference person to consult additional materials which are available, and one as the recorder to keep notes on information the group gets from the computer. They work together talking over the information on the computer screen and the options available to solve the problem. When it is finally solved, they share their success. For the next episode, they change roles until everyone has a chance to do each of them. At the end of the lesson, they discuss successful strategies with the class and reflect on how the group process worked in their group.

Many problem-solving and simulation programs work well with the learning together model. Examples are *Where in the World is Carmen Sandiego?*, *Geometry*

Supposer, and *Gertrude's Secrets*. Graphics programs, such as *PC Paintbrush IV*, can also be used to carry out an assignment where students all contribute to the final product. Often a worksheet listing the roles students are to fill and the information they are to discover, is helpful in structuring the assignment for the group.

Scenario 3

Students read different reference books as they focus on one aspect of the topic being studied. Then they gather at the computer to use a database. Together they have the information to complete each of the fields for the database entries. Later they may merge this information with what the whole class has collected and analyze all of the information.

Software databases, such as *AppleWorks*, can be used for this jigsaw method. Other programs which lend themselves to students' learning part of a program are *Odell Lake*, where each student can learn all about one fish in the food chain, *Geology Search*, where students become experts in one technical geological aspect, or *Logo*, where students can master part of a procedure.

Scenario 4

Group members review class material, checking to make sure each member understands the material. Then each member is assigned to a different game table where they meet with members from other groups. At each table a computer presents an educational game using the material studied. As the game progresses, the computer tallies the points earned by each player. At the end of the class, students bring their points back to their original group. These points are added together for a team score and winners are acknowledged.

The type of student team learning just illustrated employs a teams-games-tournaments format. Software that allows students to earn points is ideal for this format. The software should also use the content which the students have been mastering. Teachers may create their own questions on *Ten Clues* or use an authoring program such as *EZ Pilot II*. *Math Blaster* or *Whale Search* are examples of commercial software suitable for a game format. A game such as *States and Traits* can be used with points tallied on a scorecard for each time the student successfully determines the state capital.

Conclusion

Teachers may feel that students who work together are more on-task and more motivated. Students may feel that working together makes learning easier or that it is more fun. Most agree that using computers for cooperative learning is one of the ways they want to learn.

References

Aronson, E. (1978). *The jigsaw classroom*. Beverly Hills, CA: Sage Publications.

Johnson, D. W., & Johnson, R. T. (1986). *Circles of learning: Cooperation in the classroom*. Edina, MN: Interaction Book Company.

Johnson, D. W., & Johnson, R. T. (1989). *Cooperation and competition, theory and research*. Edina, MN: Interaction Book Company.

Johnson, R., Johnson, D., & Stanne, M. (1986). Computer-assisted instruction: A comparison of cooperative, competitive, and individualistic goal structures. *American Educational Research Journal, 23*(3), 382-391.

Kagen, S. (1985). *Cooperative learning resources for teachers*. San Juan Capistrano, CA: Author.

Slavin, R. (1986). *Using student team learning* (3rd ed.). Baltimore: The Johns Hopkins University.

Resources

Readings

Johnson, R., & Johnson, D. (1989). Cooperative learning and the computer. In J. Ellis (Ed.), *1988 AETS Yearbook: Information Technology and Science Education* (pp. 163-172). Columbus, Ohio: Association for the Education of Teachers in Science.

Kagen, S. (1989). *Cooperative learning resources for teachers*. San Juan Capistrano, CA: Author.

Webb, N.M., Ender, P., & Lewis, S. (1986). Problem-solving strategies and group processes in small groups learning computer programming. *American Educational Research Journal, 23*, 243-261.

Organizations

Cooperative Learning Center
University of Minnesota
150 Pillsbury Drive SE
Minneapolis, MN 55455
612/624-7031

Robert Slavin
Center for Social Organization of Schools
The Johns Hopkins University
3505 North Charles Street
Baltimore, MD 21218

IASCIE (International Association for the Study of Cooperation in Education)
136 Liberty Street
Santa Cruz, CA 95060

Spencer Kagen, Director
Resources for Teachers
27134 Paseo Espada, #202
San Juan Capistrano, CA 92675

Software

AppleWorks. Claris Corporation, 5201 Patrick Henry Drive, Santa Clara, CA 95052, 408/987-7000.

Bank Street Writer. Broderbund, 17 Paul Dr., San Rafael, CA 94903, 800/521-6263.

Decisions, Decisions. Tom Snyder Software, 90 Sherman St., Cambridge, MA 02140, 800/342-0236.

EZ Pilot II. Hartley, Box 419, Dimondale, MI 48821, 800/247- 1380.

Geology Search. Tom Snyder Software, see *Decisions, Decisions*.

Geometry Supposer: Triangles. Sunburst Communications, 39 Washington Ave., Pleasantville, NY 10570, 800/431-1934.

Gertrude's Secrets. The Learning Company, 6493 Kaiser Drive, Fremont, CA 94555, 800/852-2255.

Logo. LCSI, 330 West 58th Street, Suite 5D, New York, NY 10019, 800/321-LOGO.

Math Blaster. Davidson, 3135 Kashiwa Street, Torrance, CA 90505, 800/556-6141.

Odell Lake. MECC, 3490 Lexington Avenue North, St. Paul, MN 55126, 800/228-3504.

PC Paintbrush IV. Z-Soft, 450 Franklin Road, Suite 100, Marietta, GA 30067, 404/546-1866.

States and Traits. Designware, 185 Berry Street, San Francisco, CA 94107, 415/546-1866.

Story Tailor. *Humanities Software, P.O. Box 950, Hood River, OR 97031, 800/245-6737.*

Ten Clues. Sunburst Communications, see *Geometry Supposer*.

Whale Search from Voyage of the Mimi. Sunburst Communications, See *Geometry Supposer*.

Where in the World is Carmen Sandiego? Broderbund, see *Bank Street Writer*.

Tech Use Guides on the following topics are available from the Center upon request:

Guide for Teachers
Guide for Parents
Technology for Work, Home, and Leisure
Computer Access
Selecting Software
Speech Technologies
Preschool Children
Hearing Impairments
Computers and Writing
Computers and Cooperative Learning
Visual Impairments
Learning Disabled
Telecommunication Networks
Augmentative and Alternative Communication
Mildly Handicapped

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